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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,831	08/09/2006	George Pratt	710100-24	4288

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EXAMINER

KRUPICKA, ADAM C

ART UNIT	PAPER NUMBER
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1794

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12/29/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,831	Applicant(s) PRATT, GEORGE	
	Examiner Adam C. Krupicka	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 34-66 is/are pending in the application.
- 4a) Of the above claim(s) 59-66 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 34-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/09/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restrictions

Applicant's election of group I, claims 34-58, without traverse in the response filed November 18, 2009 is acknowledged. Claims 34-66 are pending, claims 59-66 are withdrawn.

Claim Objections

Claims 43-47 are objected to under 37 CFR 1.75(c) as being in improper form because for depending from a cancelled claim. See MPEP § 608.01(n). For the purpose of this Office Action claim 43 has been treated as depending from claim 34. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 40-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 40 recites the limitation "the axial direction". There is insufficient antecedent basis for this limitation in the claim. The examiner considers axial to mean "of or relating to an axis of rotation". Since an unlimited number of axes can be defined around an object, the reference to an axial direction does not clearly set forth the bounds of the claim and is considered

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to be indefinite. As such the term axial in claim 40 is not considered to further limit the oscillations. Claims 41 and 42 are rejected as depending on claim 40 as rejected above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34-42, 43-47, 55, 57 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schroeder (US Pat 5,229,198).

Regarding applicant's claim 34, Schroeder teaches a low-friction bearing material including a matrix formed by a wire mesh screen (*considered to be a bearing material*), which is fused with a metal backing sheet that is preferably steel shim stock that serves as a matrix for holding a polymeric resin (*considered to be a soft material with anti-seizure properties*). *See col. 2 lines 38-56 and col. 3 lines 14-30.*

Schroeder further discusses types of bearing materials which include journal bearings (*considered to have a circumferential surface, col. 1 lines 27-28*). While Schroeder does not explicitly disclose the bearing material to be in a curved shape one of ordinary skill in the art at the time of the invention would have found it obvious to shape the bearing into known bearing shapes including journal bearings as encompassed by the discussion of Schroeder. By providing the bearing material of Schroeder in a curved shape, as consistent with known bearing shapes

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including journal bearings as taught by Schroeder, the wires in the wire mesh would extend in a circumferential direction.

Regarding applicant's claims 35, 36, 37, and 38, Schroeder teaches that the polymeric resin material may cover the wire mesh in a range from a thick layer, to having the mesh exposed, which is considered to overlap applicant's claimed range. Schroeder further teaches that the thickness of the resin covering the mesh may vary depending on the load capacity of the bearing (*col. 3 line 51 and col. 4 line 10*). It would have been obvious for one of ordinary skill in the art at the time of the invention to adjust the thickness of the polymeric resin material depending on the load the bearing will be subjected to, where thinner layers are utilized under higher loads (*figures 3, 4 & 5 and col. 3 line 51 - col. 4 line 10*). One of ordinary skill would also recognize the resin layer may be consumed during use, and that the thickness may be adjusted depending on the intended use and lifetime of the final bearing. As the bearing wears through the resin material it will become thinner and thinner until it reaches the wire mesh, thereby forming bearings meeting the various thickness limitations for the present claims.

Regarding applicant's claim 39-42, Schroeder teaches a bearing material that when formed into a circumferential bearing as shown above, has wires extending in the circumferential direction, where some wires of the mesh are between other wires, where the outside wires in a formed bearing are considered to be edge wires and inner wires are considered to be intermediate wires (*figure 1*). With regards to the regular, waved shaped oscillations in the axial direction the wires in mesh of Schroeder which extend in the circumferential direction oscillate in a regular, wave shape on an axis perpendicular to the steel backing (*figures 1, 3, 4 & 5*).

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Regarding applicant's claims 43-47, Schroeder teaches the wires to be circular in cross section (*figures 1, 3, 4 & 5*) with a diameter considered to be one half the thickness of the wire mesh, where the wire mesh has a thickness in the range of 0.015 to 0.125 inches (*381 μ m to 3175 μ m*), giving a wire diameter of 166 to 1587.5 μ m (*considered to overlap the presently claimed ranges with sufficient specificity absent a showing of criticality in the claimed wire diameter, col. 3 lines 5-9*).

Further it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the thickness of the wire mesh depending on the size of the bearing and the load under which the bearing will be operated, where a thicker wire mesh will withstand greater compressive loads than a thinner wire mesh.

Regarding applicant's 55, 57, and 58, Schroeder teaches that the polymeric resin material may be polytetrafluoroethylene (PTFE) (*considered to be a polymer based composition, col. 3 lines 14-30*), having therein a mechanical filler such as a molybdenum disulfide (*considered to be an inorganic lubricant*) or graphite (*considered to be a organic solid lubricant*).

Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schroeder (US Pat 5,229,198) as evidenced by Merriman, MacDonald & Evans LTD, *A Dictionary of Metallurgy* (1958)

Schroeder teaches a wire mesh which may be composed of phosphorus bronze (*col. 3 lines 1-5*), where phosphorus bronze is considered to be a copper-tin alloy having tin concentrations such that the presently claimed range is not considered to establish a patentable

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distinction. One of ordinary skill in the art at the time of the invention would have recognized tin concentrations for phosphorous bronze alloys used in bearings to range from 3 to 18% depending on the bearing type. Further phosphorus bronze alloys when used as a bearing material usually contain phosphorous in amounts from 0.1 to 0.25%, which falls within the range as claimed by applicant. Therefore the presently claimed copper-tin alloy is not considered to be patentably distinct from the phosphorus bronze of Schroeder, as evidenced by *A Dictionary of Metallurgy* (1958), absent a showing of criticality of the claimed compositional proportions.

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schroeder (US Pat 5,229,198) as applied to claims 34 and 55 above, further in view of Scheckenbach (US Pat. 5,852,139).

Schroeder teaches a bearing material as shown above containing a polymeric resin material, but does not appear to explicitly disclose polyphenylene sulphone as the resin material. However Scheckenbach teaches a polymer mixture containing polyphenylene sulphone (*considered to be a polymeric resin based on polyphenylene sulphone*), which has good tribological properties for use in bearings (*abstract*). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the polyphenylene sulphone composition of Scheckenbach as the polymeric resin material of Schroeder in order to provided a bearing with a polymeric resin which is a known effective resin in applications such as sliding bearings and where low creep and low abrasion are required (*col. 3 liens 4-10*).

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Claims 34-42, 52 and 53, are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (JP 08-135660 A) as evidenced by Merriman, MacDonald & Evans LTD, *A Dictionary of Metallurgy* (1958)

Regarding applicant's claims 34, 39-42, 52 and 53, Yamamoto teaches a bearing having a base metal of carbon steel (*paragraph 0009*), having thereon a continuous copper or aluminum wire (*considered to be a bearing material, paragraph 0007*), which is embedded in a soft white metal (*considered to be a soft material with anti-seizure properties*). The wire material is considered to extend in the circumferential direction and to extend to the edges of the bearing. With regards to further configurations of the wire it would have been obvious to one of ordinary skill in the art at the time of the invention to configure the wire provide the most complete and even coverage of the bearing substrate including the edges. Since the bearing is subject to additional forces at the edges, for instance when a shaft moves at an angle to the bearing, one of ordinary skill in the art at the time of the invention would have found it obvious to provide bearing material along edges of the bearing for support, and where the curved wire would be considered an intermediate wire. While the curved wire continues circumferentially around the bearing it is attached in a periodic, regular wave shaped manner extending back and forth in a axial direction (*figure 2*).

With respect to the soft material, Yamamoto teaches the use of a white metal which is known to be a tin based anti-friction metal used in bearings (*A Dictionary of Metallurgy (1958)*, See "white Metal" and "Babbitt's Metal")

Regarding applicant's claims 35-38, Yamamoto teaches the wire to be buried in the white metal but does not appear to explicitly disclose how much white metal covers the wire.

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However, one of ordinary skill in the art at the time of the invention would have recognized the thickness of the soft material to depend on the intended use & intended lifetime or the amount of wear of a particular bearing.

One of ordinary skill in the art at the time of the invention would have found it obvious adjust the thickness of the white metal layer depending on the intended lifetime and operating conditions of the bearing. A bearing which is subjected to heavy loads or which is required to have long operational lifetime would require a thicker layer of white metal than a bearing subjected to medium or light loads and which is under operating conditions less often. Further one of ordinary skill would recognize as the bearing wears the white metal layer becomes thinner approaching and eventual reaching the wire layer. Therefore the instant dependant claims are not considered to establish a patentable distinction over a bearing of Yamamoto depending on a bearings particular use or particular state of wear.

Claims 43-50, are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (JP 08-135660 A) as evidenced by *A Dictionary of Metallurgy* (1958) as applied to claim 34 above, further in view of Schroeder.

Yamamoto teaches a bearing containing a wire bearing material but does not appear to explicitly disclose the size and shape of the bearing material, however Schroeder teaches a bearing material comprised of a wire of phosphorus bronze and having a thickness overlapping the instantly claimed range, as shown above. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the wire of Yamamoto in the same shape and of the

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same size and composition as that of Schroeder because it is a known effective bearing material structure and composition.

Claim 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (JP 08-135660 A) as evidenced by *A Dictionary of Metallurgy* (1958) as applied to claim 34 above, further in view of Luetkemeyer *et al.* (US Pat. 2,459,172).

Yamamoto teaches a bearing having a steel substrate, a bearing material and a soft material which may be tin based as shown above but does not appear to explicitly teach a nickel layer on the substrate, however one of ordinary skill in the art at the time of the invention would have recognized that bearings may be subject to high operational temperatures due to friction, which increases the amount of diffusion and intermetallic formation which occurs. When this happens the bearing material may become hard and brittle, which may cause the bearing to delaminate or wear on the other parts. Luetkemeyer *et al.* teach a nickel diffusion barrier layer effective in the construction of bearings for the prevention of tin diffusion (*col. 1 lines 34-50 and col. 3 lines 5-14*). It would have been obvious to one of ordinary skill in the art at the time of the invention to prevent the formation of intermetallics between the steel base and white metal (*tin based composition*) of Yamamoto by including a nickel layer on the base to prevent diffusion between the white metal and steel base.

Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto (JP 08-135660 A) as evidenced by *A Dictionary of Metallurgy* (1958) as applied to claim 34 above, further in view of Nachtman (US Pat. 2,490,700).

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Yamamoto teaches a bearing having a steel substrate, a bearing material, and a soft material which may be tin based as shown above but does not appear to explicitly teach a soft metal that is bismuth based, however Nachtman teaches a bearing coating material which may be bismuth based, such as bismuth-tin and bismuth-lead in addition to tin based (*col. 3 lines 44-61*). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a bismuth based alloy as the soft metal in place of the tin-based metal, in the bearing of Yamamoto because it is a known, effective bearing material and is further a known functional equivalent bearing material as shown by Nachtman (*col. 3 lines 44-55*).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adam C. Krupicka whose telephone number is (571)270-7086. The examiner can normally be reached on Monday - Thursday 7:30am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adam C Krupicka/
Examiner, Art Unit 1794

/Jennifer McNeil/
Supervisory Patent Examiner, Art Unit 1794